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ABSTRACT

This paper identifies issues which can best be understood within a geographic dimension and suggests how educators at all levels can help students understand the increasing interdependence in economic, political, social, and technological systems by emphasizing geography's integrative dimensions. Geography's potential as an integrating force in education is said to be due to its tendency to examine simultaneously a variety of forces and events in the overall spatial context. The premise is that policy makers and the general public have misunderstood many issues because they have failed to apply a geographic perspective. Examples of issues on which a geographic perspective is particularly important include storage of toxic chemicals and wastes, development of an efficient energy system, decay of central cities, the misuse of land for short term profit, and water crises of western and southern states. Specific tools, methods, and values which geography can bring to these issues and to the educational process in general include maps, field measurement, qualitative methods, remote sensing and interpretation, simulation and analog models, computer graphics, interactive explorations, belief that all events and occurrences interact with other things in space, and commitment to the concept of global interdependence. Specific ways in which geography can be incorporated into the curriculum are (1) helping students organize events in their spatial context (elementary grades): (2) encouraging students to use geographic methodology (intermediate grades): and (3) helping students explore specific issues and problems by using materials and methodologies from a variety of disciplines (advanced levels). The conclusion is that educators will enhance students' capabilities for understanding complexity and interdependence if they integrate geographic concepts into the curriculum. (DB)

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GEOGRAPHY AND INTERDISCIPLINARY, FUTURE ORIENTED EDUCATION

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Introduction

This paper begins from the premise (briefly argued) that education must change and become more integrative and anticipatory if it is to fulfill its obligations of preparing our youth to cope successfully with and perhaps master the world in which they will live. From this premise I will argue that interdisciplinary and even transdisciplinary education is crucial. The major thrust of this paper is that, within the above context, an essential element in the perception of the world and a crucial component of the educational system is a well thought out and designed geographic dimension. I will argue that geography (in its complete sense) must be incorporated into our educational system at all levels if we are to successfully educate ourselves and our youth.

Before I get into the principal discussion, it is useful to explore what I mean by geography and a geographic perspective. You will see some of my later arguments anticipated in what follows. All human events take place in space, they occur in places, over areas, and in the real world. Events and occurrences are important because they interact with other things in space. Place, area, and distance are non trivial dimensions to that interaction. Thus we cannot speak usefully or factually of poverty in the absence of the realization that real people at real places suffer from it. We will not understand poverty (its causes and effects) until we understand the other factors which are related to it and exhibit a spatial congruence with it. Thus poverty, unemployment, poor health, poor

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education, family breakdown, poor housing are seen to be related, in part, because they tend to occur with the same people and at the same places.

A Geographic Perspective

A geographic perspective simply means looking at things from the spatial point of view. It means asking about where something is happening and why it is happening there; it means asking about an occurrence by looking at other occurrences at the same place, near the same place, or in other related places. The absence of a geographic perspective can lead to a fundamental misunderstanding of many issues. One example is the use of the national C.P.I. (consumer price index) to measure price changes. All of you, I assume, travel, if so you have undoubtedly seen that prices change not only over time, but over space. Energy cost increases mean very different things in Florida than in Maine. Increased costs of food mean very different things in New York City than in Cedar Rapids, Iowa. In general the forces which affect our lives do so because they converge in space and interact with us at the place we are. Impacts of a problem which occurs one place diffuse to other places. This process of diffusion (be it an epidemic, a rumor, or a change in technology) is fundamentally a geographic process.

I could recite a list of issues which we have fundamentally misunderstood because of our failure to apply a geographic perspective, but such a list could take the remainder of this conference. Let me instead suggest several contemporary problems in which the geographic dimension is crucial if we are to understand and deal with them:

1. The storage of toxic chemicals and wastes (where?).

2. The development of an efficient energy system (where, for what, based on what resources?).
3. The decay of central cities.
4. The rape of our land in search of short term profits and benefits.
5. The perpetuation of poverty in specific areas.
6. The emerging water crises of the Western and Southern U.S.
7. The rapid increase in the general rate of soil erosion.
8. Cultural variation and its influence on social interaction.

In general problems related to transportation, economic development, energy use, the environment, productivity, and our social institutions all have important geographic dimensions. To ignore that dimension is to court disaster. Later in this paper I will explore in greater detail what tools, methods, and values the discipline of geography may bring to some of these issues as well as to the educational process.

Before I enter a more detailed discussion of the needs of education for the future I must make explicit some of my basic assumptions about the function of education and its goals. The fundamental objectives of all education is to provide its participants with the skills, knowledge, and exposure to prepare them to better comprehend <u>their</u> world, to make reasoned interpretations of it and to make rational decisions about their own behavior and actions. This means that the skills of information management, of critical evaluation, of logical analysis, and of information search are crucial. Facts are less important than knowing how to obtain facts and to use them. Education is fundamentally a process to enhance the capabilities of all of us to use our minds constructively and rationally. Values are not irrelevant, in fact they are quite important.

One question is: "Do we make choices that are in fact consistent with those values and are our values appropriate given an improved understanding of our world?"

The world our current students will inhabit will be, in many ways, fundamentally different from the world we grew up in. The technology, problems, issues, culture, and environment will be different. The pace of change has exceeded our attempts to improve our educational system. This is likely to continue and probably will even accelerate. There are several ways we can anticipate how the world will change over the next 2 or 3 decades. These probable changes have widespread implications for education, some of which are directly related to this paper.

One continued trend we can anticipate is the continued growth in interdependence across the earth. Economic, political, social, and environmental changes anywhere will have an increasing tendency to have impacts elsewhere over the earth. This growing interdependence is related to the increasing complexity in our economic, political, social, and technological systems. The rapid growth of information and communications technology will have greater influences on cultures throughout the world, many conflicts and contradictions between cultures (and among the components of individual cultures) can be expected.

Integrative Education

To deal with the increasing interdependence and complexity, education at all levels must do more to help all of us better integrate ideas and knowledge. This direction of education means that disciplinary boundaries must be crossed, that the relevance of a variety of perceptions, factors, and processes for any given issue must be recognized and explored (Figure 1).

THE INTEGRATIVE ZONE

Any "real" problem lies in the area identified by:

The most complex problems lie in the area identified by:

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Figure 1

One example may clarify this concept. Consider the issue of toxic waste management, disposal, and effects. To understand this issue and to develop solutions to the various problems (actual or potential) we must incorporate knowledge and ideas from chemistry, biology, geology, economics, political science, law, engineering, medicine, ecology, and geography. Each of these fields of knowledge deals with elements of the issue (Table 1). Furthermore the issue, its implications, and complexity are such that it exceeds a simple summation of the knowledge of each of these fields. The biological and the chemical elements interact, the economic and medical parts are interrelated, and all of these are interdependent in space.

The only hope we have to create a society which can make reasoned and reasonable policy on issues such as toxic wastes and to retain the basic elements of a democracy lies in providing an educational system which enhances the society's capability for understanding complexity and interdependence, and which develops a capacity for decision making under uncertainty.

All of this is not to say that the individual disciplines are irrelevant, but to argue that they are not enough. An added dimension is needed which integrates knowledge and ideas, which premeates disciplinary boundaries, and which widens the breadth of vision of our society.

Geography: An Integrative Dimension

There are two basic types of academic disciplines, those which focus on specific issues or phenomena and those which focus on specific dimensions of a wide variety of issues and phemonena. History and geography are the principal examples of the latter, with history studying things over time

TABLE 1: TOXIC WASTE DISPOSAL

A. Chemical

1. What is the chemical nature of the material?
2. What are the reactions possible when in contact with other chemicals?

B. Biological

1. What effect does the material have on life forms?
   (a) short term
   (b) long term
2. How will these effects alter different ecological systems?

C. Geology

1. What is the geomorphic structure of potential disposal sites?
2. How stable (geologically) is a site?
3. What is the underground hydrology of the potential site?

D. Economics

1. What is the cost of developing a potential site?
2. What is the cost of providing the necessary safeguards?

E. Political Science

1. Who controls the decisions?
2. What special interest groups are involved?

F. Law

1. What are the legal requirements and restrictions?

G. Engineering

1. What techniques exist to contain or control the materials under both general and site specific conditions?
2. What techniques exist to move the wastes?

H. Medicine

1. What are the potential effects on human health if exposed to this material?
   (a) seriousness
   (b) variation by mode of exposure
   (c) time lag
   (d) degree of permanence

I. Ecology

1. What is the ecological structure of a potential site?

J. Geography

1. Where are the sources of the waste?
2. What areas are geologically, economically, biologically, and ecologically appropriate?
3. How accessible to the sources are each?
4. What is the geographic relationship of a potential area to potentially sensitive populations (distance and direction)?
5. What is the "best" site for disposal?

and geography studying things over space. It is my basic argument that both of these approaches are necessary if educational systems are to provide the integrating skills discussed above. My focus in this paper is on geography, thus I will ignore history with the understanding that it too is of great relevance.

Geography has a great potential as an integrating force in education because of its tendency to examine simultaneously a variety of forces and events in the overall spatial context (place, region, or area). Its history and philosophy clearly indicate the fundamental assumption of interdependence of forces, events, and places. For example urban geographers are concerned with the relationships among urban places, the relationships of different parts of the same urban place, and of the different processes which operate within the urban context. Topics such as urban land use relate economic, social, cultural, and political forces within a physical world. Regional geography performs similar functions for wider areas. Except for history and possibly anthropology, no other discipline conciously focuses on such a wide degree of inter-relatedness. In no other field are the sources used in research and writing as diverse in their disciplinary origins.

Obviously the geography I am talking about is not "place-name geography" or descriptive, encyclopedic-geography which dominated the public schools thirty years ago (although such does have important uses). The geography I am referring to is dynamic, analytic, and synthetic. This (modern) geography provides a framework and at least part of the methodology from which we can begin to develop more holistic perceptions of the world around us. As such it is a necessary part of an education system designed

to prepare people for the complexity of the next fifty years (Figure 2).

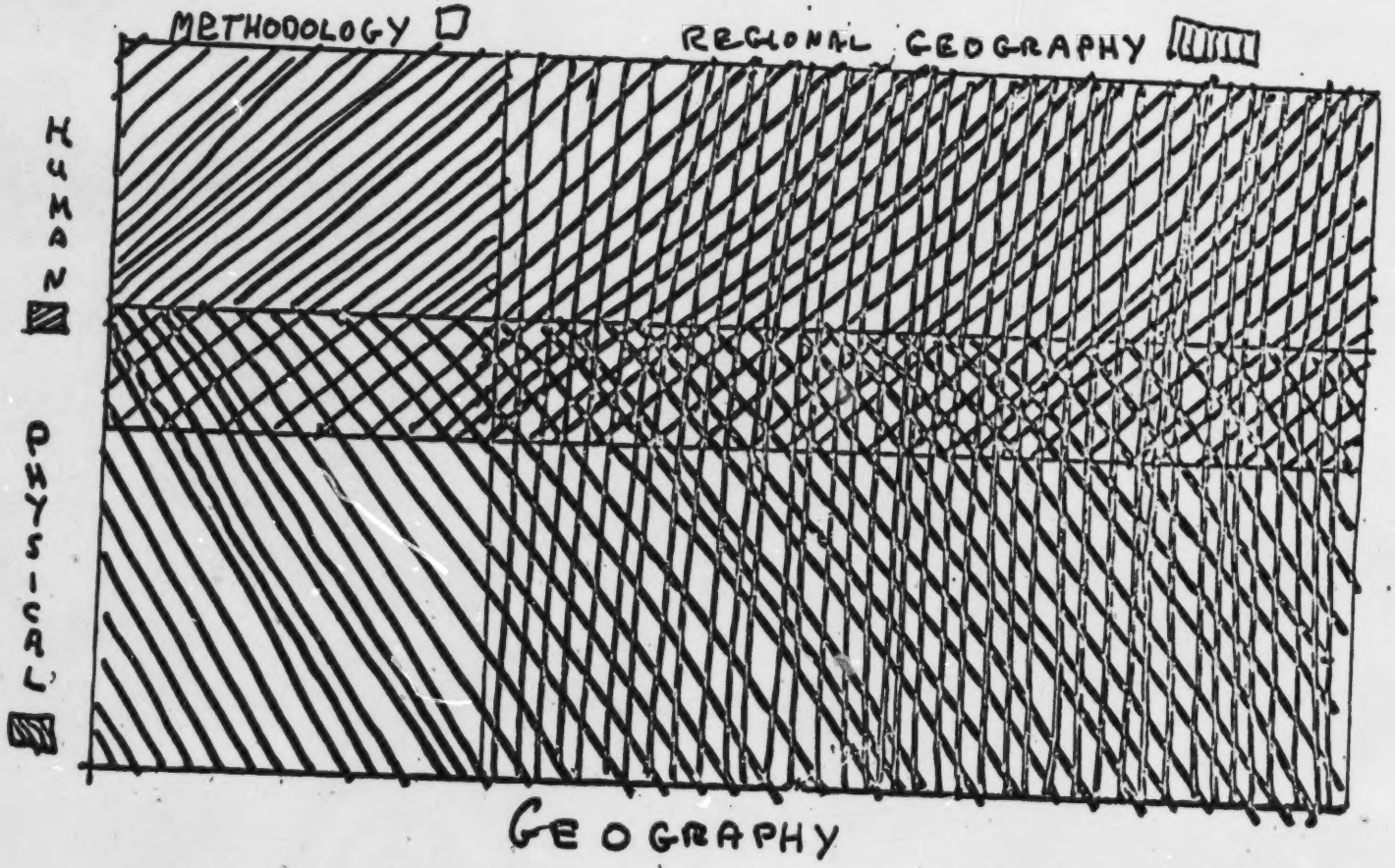
Methods and Techniques

Several basic methods and models have been developed in geography which are extremely important in understanding, exploring, and teaching about our world (past, present, and future). The most familiar area of geographic methodology is cartography or map making. The appropriate use of well designed maps may convey much more information in a more holistic manner to a broader audience than any other methodology I can think of. Unfortunately most of the maps seen by the lay public are poorly done, of limited perspective, or of a very standardized form. Exceptions to this do exist in some of our major news magazines, but these are exceptions.

The value of maps in other research or in policy endeavors can be most easily seen in the use made of maps by some medical researchers. Maps were an essential tool in understanding the cause of cholera, are of immense value in trying to understand the environmental influences on various types of cancer and in pinpointing sources of a variety of environmental hazards.

Other methodologies used in geography include field measurement, a variety of quantitative methods (with a spatial dimension included), remote sensing and interpretation, and an increased use of simulation and analog models. The increased use of computer technology, especially micro processers is, and will continue to expand the range and capability of geographic methodology. The use of this new technology for teaching is in its infancy, but I expect to see the use of expanded computer graphics, computer animation, and interactive explorations will become commonplace.

FIGURE 2
GEOGRAPHY AND IT'S SUBDIVISIONS



Other aspects of geography and geographic research also have potentially great contributions to make. Diffusion studies, the application of central place theory, understanding the cultural landscape and location and land use theory are all geographic fields which have tremendous potential to helping us understand our world as it is and as it may be.

Problems of economic development, political conflict, environmental impacts, and resource management will all be better understood by incorporating the geographic perspective. Policies concerned with housing, employment, trade, transportation, taxation, immigration, and resource utilization all stand to benefit from the use of geographic analysis. In general geographic interrelatedness is as important to understand our world as is temporal interrelatedness.

Geography in the Curriculum

To further the goals discussed thus far, geography needs to be used in three basic ways and to appear in the curriculum in three basic forms.

1. Elementary Level: The role of perceiving the geographic dimension, of becoming aware of basic geographic "facts" and processes, and of organizing events in their spatial context should begin early. This can be done in a number of forms as separate parts of the curriculum or as part of both the science and social science curriculum. In any case it requires teachers who are aware of the geographic dimension, who are knowledgeable about it, and skilled in using and in interpreting it.
2. Intermediate Level: Here the basic dimension of geographic analysis needs to be brought in including data collection, process analysis, and the use of geographic methodology.

Concepts such as diffusion, spatial correlation, distance decay, and spatial interaction are central. Again several formats are possible here, but specific courses in analytic geography seem to offer the greatest potential. These courses should be part of a broad earth science and social science component and should be taught by people adequately trained in the discipline of geography. In this context the beginning of synthesis can be introduced as well.

3. Advanced Level: Here the role of integration or synthesis should be more fully developed. The approach I suggest is to develop new courses which focus on specific issues and problems and explore them by employing materials and methodologies from the sciences, social sciences, and even the humanities. The geographic dimension provides (along with the historical dimension) the glue which holds these concepts together. Thus issues would be placed in a real world (spatial) context and the various relevant factors and processes examined. The applications of the methodologies and concepts from the analytic geographers of the earlier level would play a prominent role here. Teachers of these courses should be broadly educated rather than narrowly trained, but a major exposure to the fields of geography and history would be important. This type of course would also be highly amenable to team teaching by a variety of people with more specialized backgrounds.

The levels identified above apply throughout the educational system with greater range and sophistication added as the student proceeds from

elementary school through the university. Such changes would parallel the changes in the other disciplines. The third level (generally absent from our current educational system today) is, I believe, the essence of integrative, holistic education. Such an element depends on the early development of the first two elements and all require the geographic dimension if they are to be effective.

Conclusion

I have suggested that if education is to function well in the decades ahead it must become more integrative, more holistic, and more forward looking. I have argued that to accomplish these goals, education must re-establish a geographic component which must permeate much of the entire educational process. Not only is such a dimension needed to more fully understand our world, but such a dimension can prove to be an effective perspective from which to learn or teach about complexity and interdependence.

To change education in this manner will require close interaction of educators of all specialties including geography. It will require some fundamental changes in our educational system and in the discipline of geography. Geography departments at our universities will have to develop new courses to teach teachers these skills. Geographers will have to become more involved with our educational system as much as other educators will have to become more involved with geography. This is not an easy prescription, and it is certainly not one which can be carried out if we continue to put our own parochial concerns ahead of the overall needs of our entire educational system.

About the Author

Dr. Austin is currently Associate Professor of Geography and Regional Science at the University of Northern Iowa. He also is the current chair of the Future Studies Program, and is on the board of the Environmental Management program at the same school. He is also current editor of the journal, Geographical Perspectives and serves on the National Board of the Urban Geography Specialty Group of the Association of American Geographers. He has published a variety of papers on locational conflict, urban issues, and futures issues. He may be reached at the Department of Geography, University of Northern Iowa, Cedar Falls, Iowa 50614.